

Dear COCO 3 OS-9 User:

Hemphill Electronics, Inc. has merged with TMM, Inc. effective July 1, 1987. TMM is an electronics manufacturing company with approximately 60 employees in a 10,000 square foot facility. Our new address and phone number are;

* TMM, Inc. *
* 4480 Shopping Lane *
* Simi Valley, CA 93063 *
* (805) 581-0885 *

PLEASE.... disregard the address and phone number on the enclosed literature.

The OS-9 Operating System is one of the most powerful Operating Systems available on a Personal Computer. The enclosed Literature describes Hardware and Software products, from TMM/Hemphill Electronics, that allow the COCO 3 to attain performance levels that far exceed those of many of the small business systems in operation today!

PLUS 100.... 512K Memory Upgrade

Multi-tasking, Multi-users and High Resolution Graphic Screens all require additional memory for maximum performance. A 512K Main Memory is an absolute MUST to take full advantage of the power of OS-9. The PLUS 100 is the ONLY 512K Memory Upgrade that correctly compensates for the memory timing errors in the COCO 3 and provides the full required value of decoupling capacitance for the memory chips.

DISKMASTER Disk Drive Systems

Performance under OS-9 can be no better than the Disk Drive System. The DISKMASTER Systems offer a level of performance unequaled in the COCO 3 World. 1 MB High Speed Floppy Drives, DMA data transfer from the Floppy Drives, 20 MB Hard Drives and up to 1.5 MB of RAMDISK offer performance that EQUALS THAT OF SMALL BUSINESS SYSTEMS! PLUS...each DISKMASTER System contains a Hardware Real Time Clock with Battery Back-up, a Parallel Printer Port and three Serial Ports. All of the necessary features required for High Performance Computing in the OS-9 Environment are included in a Single Unit with a single interface connection to the COCO 3.

SCULPTOR

High performance Hardware and Operating Systems optimize the performance of Sophisticated Software. The "SCULPTOR" Fourth Generation Programming Language and Database Management System, when combined with the features of the COCO 3/DISKMASTER System, results in Applications Programs Performance that easily meets the requirements of complex business or education environments. One of the very powerful features of SCULPTOR is that it allows transportability of applications programs between Operating Systems. Under SCULPTOR you can run very powerful programs that operate on IBM, HP and Digital Equipment Computers under Operating Systems such as MS-DOS, VAX and UNIX on your COCO 3!!

VANGUARD

The VANGUARD computers are OS-9 Level 1 computers with many standard features built in. A 2 MHz CPU, 450K RAMDISK, three serial ports, printer port, 1 MB Floppy Drives, 20 MB Hard Drive and one of the most sophisticated Internal Modems in the industry are all standard. It is intended for those people who do program development under OS-9 and who need a high performance, full featured OS-9 computer, with sophisticated communication capabilities, in a small easily transportable package.

WARRANTY

MASTER PRODUCTS ARE WARRANTIED AGAINST DEFECTS IN MATERIAL OR WORKMANSHIP FOR 90 DAYS FROM THE DATE OF SHIPMENT. THIS WARRANTY IS INVALIDATED BY ANY OF THE FOLLOWING CONDITIONS.

1. OBVIOUS MISHANDLING AS EVIDENCED BY DAMAGE TO THE CASE
2. REMOVAL OF THE TAG INDICATING THE SERIAL NUMBER AND THE SHIPPING DATE
3. REMOVAL OF THE LID ON THE MAIN BOX OR THE INTERFACE CARTRIDGE

THIS WARRANTY IS IN LIEU OF ALL WARRANTIES EXPRESSED OR IMPLIED INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

PRIOR TO RETURNING ANY MERCHANDISE TO THE FACTORY, FOR A WARRANTY CLAIM, AN RMA NUMBER AND SHIPPING INSTRUCTIONS MUST BE OBTAINED FROM THE FACTORY.

READ THIS SHEET -- COMPLETELY -- BEFORE REMOVING ANYTHING FROM THE BOX!!!!

ALL DISKMASTER SYSTEMS ARE COMPLETELY TESTED AT THE FACTORY AND ARE SHIPPED CUSTOM DESIGNED, FOAM PACKAGING. SAVE THE SHIPPING BOX AND FOAM!!! UNITS RETURNED TO THE FACTORY FOR SERVICE OR UPGRADES WILL ONLY BE ACCEPTED IF THEY ARE SHIPPED IN THE ORIGINAL SHIPPING BOX.

DISKMASTER SYSTEMS REPRESENT A DEGREE OF HARDWARE AND SOFTWARE SOPHISTICATION THAT FAR EXCEEDS THE TYPICAL PERSONAL COMPUTER. HOWEVER IF THE INSTRUCTIONS ON THIS SHEET AND THE ENCLOSED "DISKMASTER SETUP AND SOFTWARE INSTALLATION" INSTRUCTIONS ARE FOLLOWED, TO THE LETTER, THE SYSTEM WILL WORK THE FIRST TIME, EVERY TIME!!

HARD DRIVE MODELS---A HARD DRIVE CAN BE DAMAGED BY DROPPING THEM ON A HARD SURFACE FROM A DISTANCE OF JUST 1 INCH!!! THE DRIVES ARE SHOCK MOUNTED IN THE DISKMASTER PACKAGE FOR MAXIMUM PROTECTION. HOWEVER, IF YOU DO NOT HAVE EXPERIENCE WITH HARD DRIVES, BE ADVISED THAT THEY MUST BE PROTECTED FROM EXCESSIVE SHOCK AT ALL TIMES! THE ENCLOSED INSTRUCTIONS STATE THAT THE "PARK" COMMAND, SHOULD BE USED PRIOR TO MOVING OR SHIPPING HARD DRIVE UNITS. IT IS ALSO RECOMMENDED TO USE THIS COMMAND EVERY TIME THE COMPUTER IS TURNED OFF.

FOLLOW THE FOLLOWING INSTRUCTIONS COMPLETELY AND IN SEQUENCE:

1. REMOVE THE TOP PIECE OF FOAM.
2. REMOVE THE DISKETTE PACKAGE MARKED "DISKMASTER INSTALLATION DISK" AND PUT IT IN A SAFE PLACE. (THIS PACKAGE INCLUDES THE INSTALLATION DISK AND 2 BLANK HIGH DENSITY DISKS.)
3. REMOVE THE INSTRUCTIONS MARKED "DISKMASTER SETUP AND SOFTWARE INSTALLATION" AND --READ THEM COMPLETELY-- BEFORE DOING ANYTHING ELSE.
4. PREPARE A CLEAN, UNCLUTTERED TABLE AREA TO THE RIGHT SIDE OF YOUR COCO 3. CAREFULLY REMOVE THE DISKMASTER DRIVE SYSTEM FROM THE FOAM AND SET IT ON THE TABLE BESIDE THE COCO 3.
5. REMOVE THE INTERFACE CARTRIDGE (WITH THE INTERFACE CABLE ATTACHED) AND THE POWER CORD AND SET THEM ON THE TABLE.
6. ---MAKE SURE THE COCO 3 IS TURNED OFF!! --- DO NOT--- APPLY POWER TO THE DISKMASTER UNTIL YOU ARE INSTRUCTED TO DO SO OR YOUR NOSE WILL GROW!!!
7. ---WITH ALL POWER TURNED OFF--- INSERT THE DISKMASTER INTERFACE CARTRIDGE INTO THE EXPANSION SLOT ON THE RIGHT SIDE OF THE COCO 3. IT IS INSERTED WITH THE LETTERING ON THE CASE TO THE TOP. BE CAREFUL TO MAKE SURE THAT THE GOLD PLATED EDGE CARD FINGERS ON THE INTERFACE BOARD ARE ALIGNED WITH THE EDGE CARD CONNECTOR IN THE COCO 3 AND THEN FIRMLY PUSH THE CARTRIDGE IN UNTIL IT IS FIRMLY SEATED. THE LINE ABOVE THE "CAUTION" WORD ON THE CARTRIDGE CASE WILL STILL BE VISIBLE WHEN THE CARTRIDGE IS FULLY SEATED.
8. PLUG THE OTHER END OF THE INTERFACE CABLE INTO THE INTERFACE CONNECTOR ON THE BACK PANEL OF THE DISKMASTER BOX. (SEE PAGE 15 OF THE "DISKMASTER SETUP AND SOFTWARE INSTALLATION" INSTRUCTIONS.) THE CONNECTOR SHOULD BE INSERTED SO THAT THE CABLE IS DIRECTED DOWNWARD.
9. MAKE SURE THE DISKMASTER IS TURNED OFF. THE POWER SWITCH IS THE ROCKER SWITCH ON THE FRONT PANEL. IT IS "OFF" WHEN THE BOTTOM OF THE SWITCH IS PUSHED IN.

ARE NOW READY TO GENERATE A BOOTABLE HIGH DENSITY FLOPPY DISK OR, ON HARD DRIVE MODELS, TO INSTALL A BOOTABLE SYSTEM ON THE HARD DRIVE. ---FOLLOW THE "DISKMASTER SETUP AND SOFTWARE INSTALLATION" INSTRUCTIONS, TO THE LETTER, AND YOU WILL HAVE NO PROBLEMS. AS STATED ABOVE, READ THESE INSTRUCTIONS THROUGH COMPLETELY BEFORE BEGINNING.

DISKMASTER SOFTWARE UPDATE TO RELEASE 2

THE ENCLOSED FLOPPY DISK CONTAINS SOFTWARE TO UPDATE YOUR DISKMASTER SYSTEM TO RELEASE 2. THE INSTRUCTION SHEET FOR THE "DISKTYPE" COMMAND IS ALSO ENCLOSED. THIS COMMAND WAS INADVERTENTLY LEFT OFF OF YOUR INSTALLATION DISK AND IS INCLUDED ON THE ENCLOSED UPDATE DISK.

THIS DISKETTE IS A STANDARD DENSITY, RADIO SHACK FORMAT DISK. IT IS ACCESSED AS /ND0 OR /ND1 DEPENDING ON WHICH DISKMASTER SYSTEM YOU HAVE. LIST THE "readme" FILE FOR COMPLETE INSTRUCTIONS.

IF YOU HAVE ANY QUESTIONS REGARDING THE UPDATING OF YOUR SYSTEM SOFTWARE PLEASE CONTACT D. P. JOHNSON AT 503-241-8152 BETWEEN 9:00 AND 11:00 AM PACIFIC TIME.

DISKMASTER SETUP AND SOFTWARE INSTALLATION

SETUP: The DiskMaster main unit is connected to the CoCo-3 by a single cable from the back of the main unit to the interface cartridge which plugs into the CoCo expansion slot on the right side. WITH BOTH THE COCO-3 AND THE DISKMASTER UNPLUGGED FROM THE AC POWER, connect the 3 foot interface cable (supplied) to the back of the disk master main unit. The cable has a different type of connector at each end, only one will fit. The connector should be plugged into the mating connector near the bottom of the DiskMaster back panel so that the RED STRIPE on the cable is toward the right when you are viewing the back panel (the side away from the AC receptacle). The cable will be coming out of the lower edge of the connector when it is mated with the DiskMaster main unit. Stretch the cable out so it is not twisted, and with the connector at the far end in one hand, hold the interface cartridge FACE UP (i.e. the side with writing on it will be up) in the other hand and plug the connector into the cartridge. Note that there is a 40 conductor gold plated board edge at each end of the cartridge. There are arrows painted on the cartridge lid which point to the end that is to be inserted into the COCO-3 expansion slot, the other end connects to the cable. The cable should be coming out of the lower edge of the connector when it is plugged into the interface cartridge. Plug the cartridge into the CoCo-3 expansion slot MAKING CERTAIN AGAIN THAT THE POWER IS OFF. NEVER INSERT OR REMOVE THE CARTRIDGE FROM THE COCO WHILE THE POWER IS ON TO EITHER UNIT, DOING SO MAY CAUSE DAMAGE TO THE DISKMASTER AND/OR THE COLOR COMPUTER. If everything is connected properly, when you are in front of the CoCo-3, the cartridge will be inserted in the slot on the right and the edge of the interface cable with the red stripe will be TOWARD you. Looking at the back panel of the DiskMaster, the red stripe on the cable will be toward the RIGHT of the back panel.

Plug in the DiskMaster power cord and the CoCo power cord and the monitor and you are ready to go. You may power up the DiskMaster either before or after the CoCo-3, but we recommend applying power to the DiskMaster first so that when the CoCo is powered on the DiskMaster will receive the processor's power on reset signal. In either case shortly after you hit the reset button on the CoCo-3, the monitor screen will show the message "DISKMASTER BOOTSTRAP ROM" followed by the rom version number. If you do not touch the keyboard the system will attempt to boot automatically after about a 2 second delay. The DiskMaster rom will first attempt to boot from a HIGH DENSITY Floppy in drive /d0. If the drive is empty, an attempt will be made to boot from the hard disk (if present). Since you do not yet have a bootable HIGH DENSITY FLOPPY and the hard disk is blank, there is a third boot mode called "RAW BOOT" which will boot the original Normal Density OS-9 level 2 disk. If after you hit the reset button on the CoCo you hold down the space bar a menu will appear on the screen which will allow you to specify Booting from the floppy, or Hard disk, or Raw boot.

SOFTWARE INSTALLATION

You will need the OS-9 Level 11 package from Tandy, version 02.00.01, and the installation disk included with the DiskMaster. The installation software package contains the Installation disk, and two blank HIGH DENSITY disks. It is important to understand that the HIGH DENSITY floppies are different from the normal floppies used by the CoCo. The oxide on the disks is different and the write current to the disk drives heads is different in the high density mode. The DiskMaster floppy drives are dual speed, they are compatible with "normal density" floppies at 300 rpm and also the High Density floppies at 360 rpm. When you buy diskettes to be used in the High Density mode (which is the default operating mode of the DiskMaster) be sure to get those that are specified as for the PC-AT type drives. They specifically say "HD" or "High Density" on the box or disk label. Use these only in the High density mode because surprisingly they may not work well when recorded in the "Normal Density" mode (this is because of the different oxide formula and the difference in the recording intensity in normal density).

Most of the installation process is performed automatically by the macro program "install" on the Installation disk. It is important to follow these instructions exactly. Don't try to take what you might think will be a short-cut. Don't do any extra steps either, specifically DO NOT ATTEMPT to start any windows before completing the installation. There are some bugs in the OS-9 02.00.01 release, two very important ones are fixed by the installation procedure and one of these deals with the use of windows, so by trying to take short-cuts or adding some extra steps you will probably succeed in crashing your system.

During the installation the original OS-9 level two system disk that you get from Tandy will be referred to as the "ORIGINAL RAW SYSTEM" disk. The other disk in the OS-9 package, the "BOOT/CONFIG/BASIC09" disk will be used also. Either of the two installation disks in the DiskMaster software package can be used and these are referred to as the "INSTALLATION DISK". If you have the Dual Floppy DiskMaster model, the installation procedure will give you a bootable HIGH DENSITY floppy (using one of the blanks included with the installation package). For the hard disk/floppy model the installation procedure makes the hard disk bootable. After this is completed you may easily make bootable floppies also. Unfortunately there is no way to make a backup of the original RAW system disks until after the installation, so as a safety precaution PUT A WRITE PROTECT TAPE ON THESE BEFORE YOU PROCEED.

NOTE: On the dual floppy DiskMaster model drive 0 (/d0) is on the bottom, on the Hard Disk/Floppy model /d0 is of course the only drive.

Step 1: Power on the system, press the reset button on the back of the CoCo-3 then immediately hold down the keyboard space bar until the boot menu appears on the monitor screen.

Step 2: Place the "RAW SYSTEM DISK" in /d0 (label side up).

Step 3: Press the "R" key on the keyboard... the system should boot at this point. Enter the date when requested.

Step 4: Do the following two OS-9 commands;

```
tmode -pause  
load modpatch
```

Step 5: Remove the "RAW SYSTEM DISK" from /d0, and insert the "INSTALLATION DISK".

Step 6: Enter one of the following command lines (followed with a return) depending on which DiskMaster model you have;

For the Dual Floppy Unit:

```
/d0/cmds/install
```

For the Hard Disk/Floppy Unit:

```
/d0/cmds/install --h
```

From this point on the install program will take over. Follow its instructions carefully, it will instruct you to change disks several times and after each time wait for you to answer the "Ready?" prompt on the screen with a "Y" before proceeding.

IMPORTANT: For the hard disk installation, the hard disk will be reformatted. During this the screen will show the questions: "Perform PHYSICAL format in addition to LOGICAL?" and "Perform PHYSICAL verify pass?", do NOT respond to either of these.

Near the end of the procedure it will also ask you questions about the console screen (whether you want the COCO-2 COMPATIBLE screen, and whether you want the console to boot up as window /w7 i.e. an 80 column 24 line screen). These are all Yes/No questions and you should answer by typing either "Y" or "N". If you do not select the CoCo-2 Compatible screen you will save some system memory as the driver for this will not be loaded. If you have the Ram Disk option installed, you will also be asked if the size of the ram disk is 1.5 MB, if you answer "N" it will ask if it is 1.0 MB, and if you answer no again it will assume .5 MB is the size.

This procedure takes approximately 15-20 minutes. Once it is completed you will be able to boot from either the Hard disk or the High Density Floppy you just made, depending on which model Diskmaster you are using. To boot from the High Density floppy, place it in drive /d0 and hit the reset button on the back of the COCO-3, The system should boot after a few seconds. For the Hard disk, remove the diskette from drive /d0 and hit reset, the access light on drive 0 should come on briefly and then go out (if there is no disk in the drive) and the system will then boot from the hard disk.

You may want to edit the startup file to specify the correct "montype". It is set to "m" by install, which gives a readable screen for both the rgb and monochrome monitors, so if you are using a tv output (yuck) you will need to do "montype c" after you boot to get a readable screen. It is a good idea to "iniz" devices you use in the startup file to prevent the system task memory from becoming fragmented when the device buffer memory is allocated later.

The DiskMaster is a unique system, please read all the remaining documentation before you proceed to muck it up.

GENERAL INFORMATION
(But none the less important)

The installation procedure will leave several directories on the new bootable disk, these are:

SPAREMODS which contains all of the original OS-9 modules copied from the original BOOT/CONFIG/BASIC09 disk MODULES directory, except for the floppy and hard disk modules which are of no use with the DiskMaster system. There are several modules here which were not included in the OS9Boot file on your new disk which was generated by the INSTALL procedure. These are for using the serial ("bit banger") port on the back of the COCO and ACIAPAK and MODEM cartridges in a multipak. If you need any of these, copy them to the FMODS or HMODS directory to generate a new boot.

FMODS contains all the modules used to generate a bootable floppy.

HMODS contains all modules used to generate a bootable HARD disk.

DM.MODS contains copies of the diskmaster specific drivers and descriptor modules, as well as the replacement clock module.

SYS contains the sys files from the original OS-9 system disk plus the files kernel.f (floppy boot kernel) and for hard disk systems kernel.h (the hard disk boot kernel). These kernel files contain OS9P1, the boot module and patch code for OS9P1. DO NOT DELETE these FILES. You will need them for generating bootable disks with OS9GENX, more on this later.

PATCHES contains several files with a ".pat" suffix which are used as input to the MODPATCH utility. Most of these were used during the installation process and are no longer required. The files login.level.ed9.pat and login.level.edl2.pat will be useful however to patch the OS-9 level-1 LOGIN command, if you have this. Once patched, the level-1 LOGIN will function properly under level-2. To use these, load the level 1 login into memory. Then check the edition number with the ident command, it should be either edition 9 or 12. Run MODPATCH redirecting its standard input to the appropriate patch file. Afterwards you may use the msav command (equivalent to the save command,...see later documentation) to save the updated version. By copying the TSMON command from level 1 also and creating a PASSWORD file in the sys directory you will be able to run users on terminals attached to ports t4, t5 and t6.

The orginal FORMAT, OS9GEN, COBBLER and CONFIG commands must NOT be used. These have been deleted already from your new system disk. The OS9GEN command is replaced by the new command OS9GENX which has a similar function and is documented later. You must use this for generating bootable disks. The format command is replaced by the more comprehensive SFORMAT which is used to format all types of OS-9 floppies, the hard disk and the Ram

disk.

DRIVE NAMES: The drives /d0, /d1 are HIGH DENSITY ONLY, for "NORMAL DENSITY" disks (either single or double density) use the names /nd0 /ndl etc. which refer to the same physical drives as /d0 and /d1 but tell the system to treat these as the normal density types. The default format for /nd0, /ndl, and /nd2 is COCO OS-9. The default format for /d0 /d1 is mizar format, these defaults can be changed temporarily with the DISKTYPE command. If the disk you want to access or format is other than the default, use the DISKTYPE command first to setup the drive descriptor for the correct format before you try to access or SFORMAT the disk. To access a NORMAL COCO OS-9 DISK access it in drive 0 or 1 as /nd0 or /ndl respectively.

The hard disk is /H0, and the Ram disk is /R0.

The driver performs sector caching for the drives /d0 and /d1 on high density mode only. The DiskMaster main unit contains a separate buffer ram for floppy reads. This ram can contain at least 32 sectors. The driver automatically maintains the most often and most recently read sectors for either drive 0 or 1, or both depending on usage. For many operations some or all of the sectors that may need to be read will already be in this cache ram in which case the driver will not need to actually read the floppy, since it can take the data directly from the cache. This can speed up disk operation considerably in many cases. When ever a write occurs to a disk it is immediately written to the floppy, so you need not worry about removing the disk before it is updated. Also, the drives in the DiskMaster have a special polling feature which allows the driver to determine if the diskette has been changed. This is activated by the drive door being opened and the diskette being removed (at least far enough to trigger the write protect sensor LED). After a disk change, the driver will of course assume that any sectors cached for that drive are no longer valid and will force a physical read of the sector even if it was already cached. This means that caching operations are completely transparent to the user. You should note however that after a disk change the drive will continue to assert the disk change signal until a seek is done on that drive, because of this it may appear sometimes that no caching is being done, as soon as a seek occurs on that drive the caching will resume however. To demonstrate the caching feature do a "dir x" command (if the execution directory is on the floppy). If the access light on the drive lights up, repeat the command and you will notice that the second time the light will not come on and the command list will come up faster. If you remove the disk from the drive and replace it you will notice the next time you do the command the drive will be accessed again.

Other new commands included are: PARK, LS, MSAVE, and SETBAUD. Use the park command to park the head on the hard drive before moving or shipping the unit. This moves the head to a special location which makes the drive more resistant to shock damage. Never move the Hard drive while it is running. Try parking and

unparking the head to see how this works. The setbaud command is used to change the baud rate on the serial ports t4,t5 and t6. The default setting is 9600 baud.

CLOCK: The DiskMaster clock module has set the system tick time to 1/60 second which is more appropriate for multiuser timesharing operations than the 1/10 second tick time. SETIME and DATE automatically access the built in time of day clock. A setime call with the hours and minutes both=0 will only initialize the clock routines and NOT actually set the time, any other hour/minute value will change the actual time (keep this in mind if you are trying to set the clock at midnight).

EXTERNAL FLOPPY DRIVES: The DiskMaster can control up to 4 floppy drives of either the normal 5-1/4" or High Density type. (It should also be able to control 3.5" drives). External drives can be connected via a 34 conductor ribbon cable to the connector on the back panel of the DiskMaster. This connector is in the upper left hand corner of the back panel, and pin one on this connector is the rightmost pin on the upper row of pins (when viewing the back panel). External drives may have one pull-up resistor network of 330 ohms or more installed. (TEAC drives use this value). For drives that use a 150 Ohm pull-up, all pull-up networks should be removed since this added to the pull-up already on the internal drive(s) will overload the control circuit drivers. The drive select jumper on the external drive(s) must also be set to the appropriate setting: for the dual floppy DiskMaster 2, or 3; and for the Hard disk model 1, 2, or 3. There are device descriptors included in the DM.MODS directory for an external 40 track single or double sided drive as /nd2. You will have to generate a new bootable disk (or link to a new bootfile on the hard disk), adding the device descriptors for the external drive(s). If your requirements are other than this, see the SRC directory on the installation disk which contains several device descriptor source code files. Modify one of these to suit your externally connected drives. NOTE that for normal density drives, the drive number in the descriptor will be the actual physical drive select number plus four. For High Density drives the logical select number in the descriptor is the same as the physical drive number.

HIGH DENSITY DISKS: The high density diskettes, which record data at twice the rate of the normal density floppies, seem more susceptible to problems from contamination and rough handling than the normal floppies. Return diskettes to their protective envelopes immediately after you remove them from the drive, and keep all diskettes in a file box to prevent dust from accumulating on them. Avoid touching the oxide coating on the diskettes. If your environment is dusty or smokey you will probably experience more disk errors than you otherwise would.

DISKMASTER I/O PORTS

View the back panel of the DiskMaster, the 25 pin female D connector is the parallel port /P1. The three 9 pin male D connectors are from left to right /T4, /T5, and /T6.

The printer port is Centronics compatible and uses the same printer cable as the IBM PC or compatibles. This port may also be used as a parallel TTL compatible input and is implemented with the B side of a 63B21 PIA. All data lines are zener clamped to avoid accidental damage to the PIA but such damage may still be possible if this port is connected to improper voltage levels.

/P1 Connector pin-out is as follows:

Pin

- 1 Strobe Output (source 5ma, or sink -40ma from pia CB2)
- 2 Data bit 0 (all data bits source/sink 1 ttl load)
- 3 Data bit 1
- 4 Data bit 2
- 5 Data bit 3
- 6 Data bit 4
- 7 Data bit 5
- 8 Data bit 6
- 9 Data bit 7
- 10 Ack input (connects to pia CB1)
- 11 N.C. (no connection)
- 12 N.C.
- 13 N.C.
- 14 5 volts (through 3.3K Ohms)
- 15 N.C.
- 16 5 volts (through 3.3K Ohms)
- 17-25 Ground

SERIAL PORTS

The three serial ports have the same pinout as the IBM PC-AT and compatible serial ports, although only tx,rx,dcd,dtr are actively connected. Most PC-AT cables you may buy, are set up for DCE (modems) rather than DTE (terminals), i.e. pins 2 and 3 are crossed. Signal levels are RS232-C.

Pin

- 1 DCD (input to computer, also pulled to +12v through 10K ohms, may be left unconnected.)
- 2 RX (receive data, input to computer)
- 3 TX (transmit data, output from computer)
- 4 DTR (output from computer)
- 5 GROUND
- 6 N.C. (no connection)
- 7 +12V (RTS output always true)
- 8 N.C.
- 9 N.C.

To connect a diskmaster serial port to a video terminal, the following cable should be used:

DiskMaster Port	Crt Terminal
9 pin female D	25 pin male D
2 -----	2
3 -----	3
5 -----	7

For a serial printer or other device that requires handshaking, the DCD input should be used as the handshake input (to stop transmission to the device.)

NOTE: The "baud" parameter as shown by the XMODE command for T4, T5, and T6 is the 6551 control register value, which is not the same as defined for the Radio Shack serial ports. Use the SETBAUD command to change the port baud rates, not the baud code values as shown under the XMODE command documentation. The descriptor "type" byte is the 6551 command register value. When both "type" and "baud" bytes in the descriptor are 0 then the default setting is used, which is 9600 buad, 8 data bits, 1 stop bit, no parity.

SETBAUD

Syntax: ~~SETBAUD /device baudrate~~

~~Sets the baud rate of the specified device (serial port) to the value given. The new baud rate will be in effect immediately, and the device's descriptor is altered for the new baud rate.~~

~~Valid baud rates are: 50, 75, 110, 135, 150, 300, 600, 1200, 2400, 3600, 4800, 7200, 9600, 19200 .~~

Examples: ~~setbaud /t4 300~~

~~setbaud /t5 4800~~

MSAVE

Syntax: MSAVE [-Sn] modulename [modulename...] >output_path

Copies the listed modules from memory to the standard output. If the -Sn option is used, "n" bytes (decimal) are saved from the beginning of the modulename given. For the -s option, only one modulename should be specified.

Example: msave clock cc3go init >stuff

Saves the three modules clock, cc3go, and init to the file "stuff" in the current directory.

```
msave -s3840 os9pl >os9plx
```

Saves 3840 bytes (decimal) beginning with the start of the module OS9Pl, to the file "os9plx". This includes some code from after the end of the module.

PARK

Syntax: Park [-u] /Device_name

Used to park the hard disk drive head to an unused track.

Park /h0 will park drive /h0, (this also powers down the drive motor). The command will take 10-15 seconds to complete.

The -u option is used to Unpark the head and power on the drive motor after it has been parked.

NOTE: The park command should be issued prior to physically transporting the hard drive or the system with a hard drive installed.

Examples: park /h0

parks the head of drive /h0, and

```
park -u /h0
```

unparks it.

SFORMAT

SYNTAX: SFORMAT /devname [opts]

Sformat when used with SDISK intalled allows formatting any OS-9 format diskette with one or two sides and any number of cylinders, up to the capacity of the drive. Sformat will also format the DiskMaster hard disk and Ram disk. For floppies, the device name ("/*devname*"), i.e. device descriptor will determine whether the disk will be High or Normal Density and the type of OS-9 format. The DISKTYPE command alters the descriptors for formatting the various formats, e.g. Standard, COCO, Mizar, etc.. Sformat options allow for variations in the number o sides and tracks and the track density of the disk. If the "R" option is not given SFORMAT will display a table of format parameters for the given drive "*/devname*" and wait for operator response to quit the program, continue formatting, or change the parameters.

opts: S = Single density (valid only for OS-9 standard format)
D = Double density
R = Ready (proceed immediately with formatting)
1 = 1 side
2 = 2 sides
4 = 48 TPI (to format 48 TPI on a 96 TPI drive)
"disk name"
'no. of cylinders'
:Interleave:
/Cluster size/

The above options will overide the default parameters taken from the device descriptor module for the format operation. If the "R" option is used, formatting will begin at once without waiting for the operator to enter (Y, Q, or N).

EXAMPLE:

OS9: sformat /d1

*** STANDARD DISK FORMAT ***
(C) Copyright 1985 D. P. Johnson
All Rights Reserved

FORMAT PARAMETERS:

Double Density
Mizar OS-9 8" (Hi Density) format
96 TPI
80 Cylinders
2 Surfaces

28 Trk 0 Sectors
28 Sectors/Track
Interleave offset = 4

Formatting drive /d1
y (yes), n (no), or q (quit)
Ready?

Change to 48 TPI?Y
Double Sided?N
No. of Cylinders=35

FORMAT PARAMETERS:

Double Density
Mizar OS-9 8" (Hi Density) format
48 TPI
35 Cylinders
1 Surfaces

28 Trk 0 Sectors
28 Sectors/Track
Interleave offset = 4

Formatting drive /dl
y (yes), n (no), or q (quit)
Ready?Q

The "Q" entered above quits (exits) the program without formatting the disk on /Dl. By entering "Y" the formatting operation would proceed. The parameters in the original table are determined by the drive capabilites defined in the drive device descriptor. These parameters can also be changed by options included on the command line when SFORMAT was invoked. To format an OS-9 Standard Format disk, one of the device descriptors (e.g. /ndl) must be configured for the standard format with the DISKTYPE utility before SFORMAT is used.

Example: sformat /ndl rsl '35 "Standard Disk":3:

This example will immediately begin formatting the disk in drive l without waiting for a "ready? Y" response. The disk will be formatted as Single density, 1 side, 35 track, with a volume name of "Standard Disk", and an interleave of 3.

When formatting a HARD DISK after the "Ready?" prompt is answered "Y" the addition query:

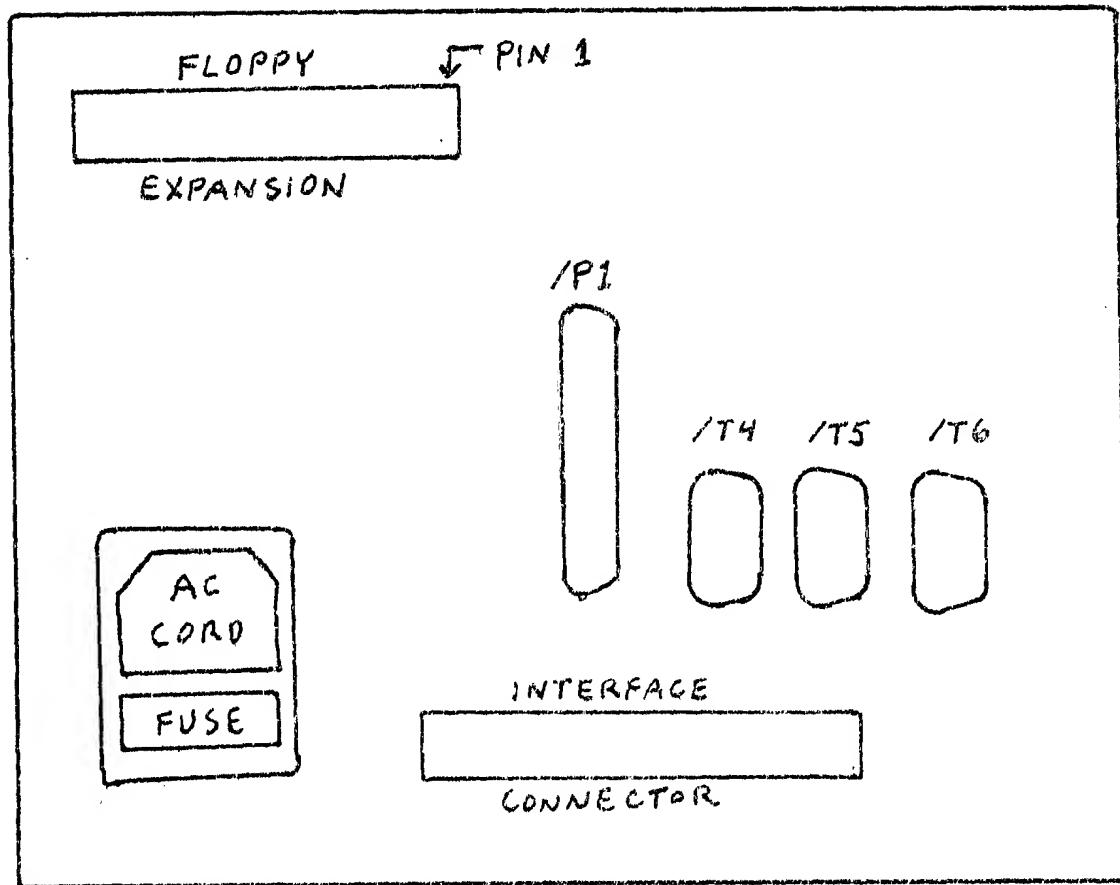
"Perform PHYSICAL format in addition to LOGICAL?"

will appear. If you answer Yes the drive will be physically reformatted otherwise only a LOGICAL formatting (i.e. blank directory structure initialization) occurs.

After formatting the hard drive the prompt:

"Perform PHYSICAL verify pass?" will appear. Physical verification of intelligent hard drives (i.e. DISKMASTER) is usually unnecessary since the drives have already used spare

sectors for any bad sectors and have error correction built in. However if you feel like wasting the time it will take on the order of 1 Min./Megabyte for the verify pass.



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DISKTYPE

SYNTAX: Disktype [-opts] /device [/device ..]

Used to modify a disk descriptor for various OS-9 formats. If no options are given then the current device setting is displayed only.

Options: -c Set for Color Computer OS-9 format.
-j Set for Japanese OS-9 formats.
-m Set for Mizar type OS-9 formats.
-s Set for Standard OS-9 formats.

Examples: Disktype /d0 /ndl
(identifies the current settings of d0 and ndl).
Disktype s dl
(sets /dl to access any Standard OS-9 format).

Once the descriptor is set for a particular OS-9 type, you may format that type with SFORMAT. The disk type you set will remain in force until you change it back again with disktype or you reboot.

Example: If you need to read/write a Standard OS-9 disk format, e.g. single density on /ndl,

disktype -s /ndl

would set the drive for this type, you could then do a dir, copy etc. to this disk, you can not use a Color Computer format disk in this drive again until you do

disktype -c /ndl
to restore the drive to the COCO format.

SETBAUD

(edition 7)

Syntax: SETBAUD [-opts] /device baudrate [-opts]

Set the baud rate of the specified device (serial port) to the value given. The new baud rate will be in effect immediately, and the device's descriptor is altered for the new baud rate. Options also allow change of the word size, number of stop bits, and the parity value.

Valid baud rates are: 50, 75, 110, 135, 150, 300, 600, 1200, 2400, 3600, 4800, 7200, 9600, 19200 .

The options (-opts) have the form -Xn , i.e. a hyphen followed by a single option letter followed by a numeral. Multiple options can be specified as -AnBn etc.

OPTIONS: -Sn Number of stop bits

n=0 = 1 stop bit (default value)
n=1 = 2 stop bits, except for 8 bit word with
parity 1 stop bit will be transmitted
and for 5 bit words 1.5 stop bits will
be transmitted.

-Pn Parity value

n=0 = No parity (default value)
n=1 = Odd parity transmitted and received
n=3 = Even parity transmitted and received
n=5 = Mark parity transmitted, parity check
disabled.
n=7 = Space parity transmitted, parity check
disabled.

Other values of n are invalid and will cause
unspecified results.

-Wn Word length in bits

n may be 5, 6, 7, or 8. The default is 8.

Examples: setbaud /t4 300 -w7p1 (7 bits 1 stop odd parity)

setbaud /t5 4800 (8 bits default 4800 baud)